MODELS 810A & 880

FORM 94X707-952
RUN NO. 1 - 8
D & H 800D

television

SERVICE MANUAL

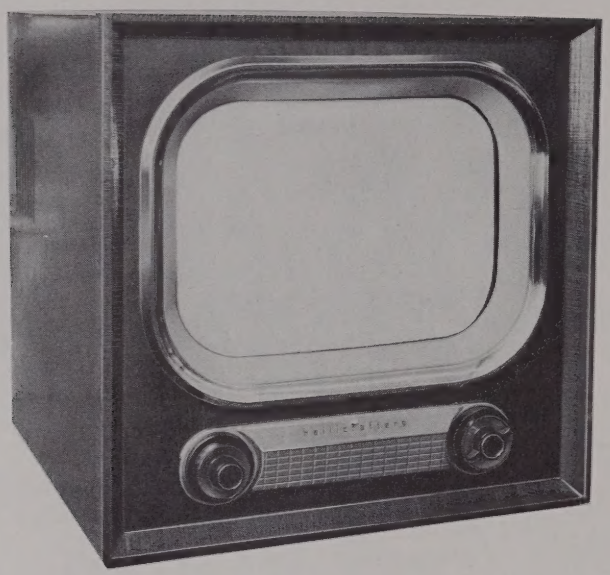
92X1368

SERIES
800

MODEL 880—MAHOGANY

(SEE PAGE 2 FOR OTHER CABINET ILLUSTRATIONS)

the hallicrafters co.
MANUFACTURERS OF RADIO AND ELECTRONIC EQUIPMENT, CHICAGO 24, U. S. A.



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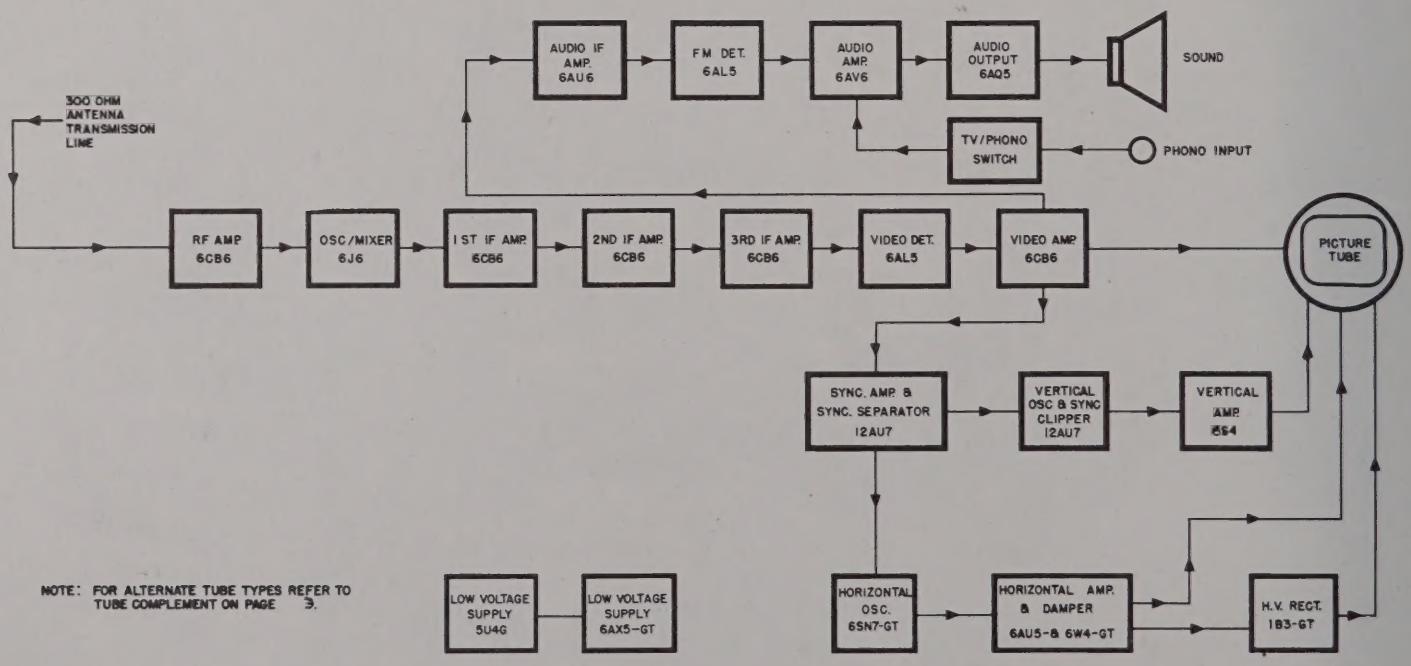
MODEL 810A - MAHOGANY



NOTE: FOR ALTERNATE TUBE TYPES REFER TO TUBE COMPLEMENT ON PAGE 3.

92D1189-A

FIG. 1. FUNCTIONAL BLOCK DIAGRAM

GENERAL SPECIFICATIONS

TUNING . . . . . 12 channels, 2-13.

ANTENNA . . . . . Hallicrafters Built-In Silver Vortex.

INTER-CARRIER SOUND SYSTEM . . . . . 4.5 MC.

POWER SUPPLY . . . . . 110-120 volts, 60 cycles AC.

SPEAKER
(Model 810A) . . . . . 5 inch PM
(Model 880) . . . . . 10 inch PM

PICTURE CARRIER IF . . 26.25 MC.

SOUND CARRIER IF . . . 21.75 MC.

POWER CONSUMPTION . 235 Watts.

TUBES . . . . . 21 Including 3 Rectifiers.

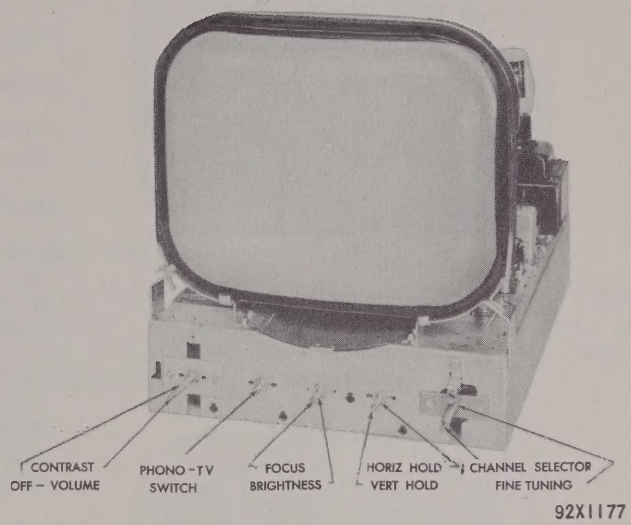


FIG. 2. CHASSIS FRONT VIEW OF MODEL 810A (Control positions same for both models)

TUBE COMPLEMENT

V 1	6CB6	RF Amplifier
V 2	6J6	Osc/Mixer
V 101	6CB6	1st IF Amplifier
V 102	6CB6	2nd IF Amplifier
V 103	6CB6	3rd IF Amplifier
V 104	6AL5	Video Detector
V 105	6CB6	Video Amplifier
V 106	12AU7 or 6SN7GT*	Sync. Amp. & Sep.
V 107	12AU7 or 6SN7GT*	Sync. Clipper & Vertical Osc.
V 108	6S4	Vertical Amp.
V 109	6AU6	Audio IF Amplifier
V 110	6AL5	FM Detector
V 111	6AV6 or 6SQ7*	Audio Amplifier
V 112	6AQ5	Audio Output
V 113	6AX5GT or 6X5	LV Rectifier
V 114	5U4G	LV Rectifier
V 115	6SN7GT	Horizontal Osc.
V 116	6AU5 or 6AV5GT	Horizontal Amp.
V 117	6W4GT	Damper
V 118	1B3GT	HV Rectifier
V 119	16RP4 (Model 810A)	16" Black Rect Picture Tube
V 119	19AP4A (Model 880)	19" Black Round Picture Tube

* These tubes are not directly interchangeable. For socket wiring of each type refer to the schematic diagram.

HIGH VOLTAGE WARNING

OPERATION OF THE RECEIVER CHASSIS OUTSIDE OF THE CABINET INVOLVES DANGER OF ELECTRICAL SHOCK. EXERCISE ALL NORMAL HIGH VOLTAGE PRECAUTIONS WHEN WORKING WITH THIS RECEIVER.

PRODUCTION CHANGES

CHASSIS IN WHICH CHANGES OR SUBSTITUTIONS WERE MADE DURING PRODUCTION MAY BE IDENTIFIED AS FOLLOWS:

CHASSIS STAMP (under HORIZONTAL RANGE control)	CHANGE OR SUBSTITUTION
A	Fuse, F-101, added to the circuit.
1	Type 6SQ7 tube substituted for type 6AV6.
4	Type 6SN7-GT tube substituted for type 12AU7.
5	Both of the above tube substitutions.

CHASSIS STAMP (Under HIGH VOLTAGE control)	CHANGE OR SUBSTITUTION
D	Chassis type D800D, 16" rect. picture tube.
H	Chassis type H800D, 19" round picture tube.
C	Color Plug, PL-105, and Color Socket, SO-105, added to the circuit. (See Fig. 29, Schematic Diagram).
T	Alternate power supply used. (See Fig. 29, Schematic Diagram).
6	FOCUS control, R-159, moved to the rear apron of the chassis into the HIGH VOLTAGE control position. The HIGH VOLTAGE control R-182, is deleted and B+ is tied directly to the plate of V-117, DAMPER.
7	HORIZONTAL HOLD control, R-171, moved to the rear apron of the chassis into the HORIZONTAL DRIVE control position. The HORIZONTAL DRIVE control R-176, and resistor R-174, are replaced by a 39,000 ohm 1/2 watt resistor (23X20X393K). The word "HORIZONTAL" on the front control knob escutcheon is eliminated.
8	Includes changes T, C, and 7.

SERVICE ADJUSTMENTS

NOTE: The sequence of "SERVICE ADJUSTMENTS" outlined herein is suggested as a convenient method of approach and is not an arbitrary procedure. Variations of the procedure are permitted to obtain the final result.

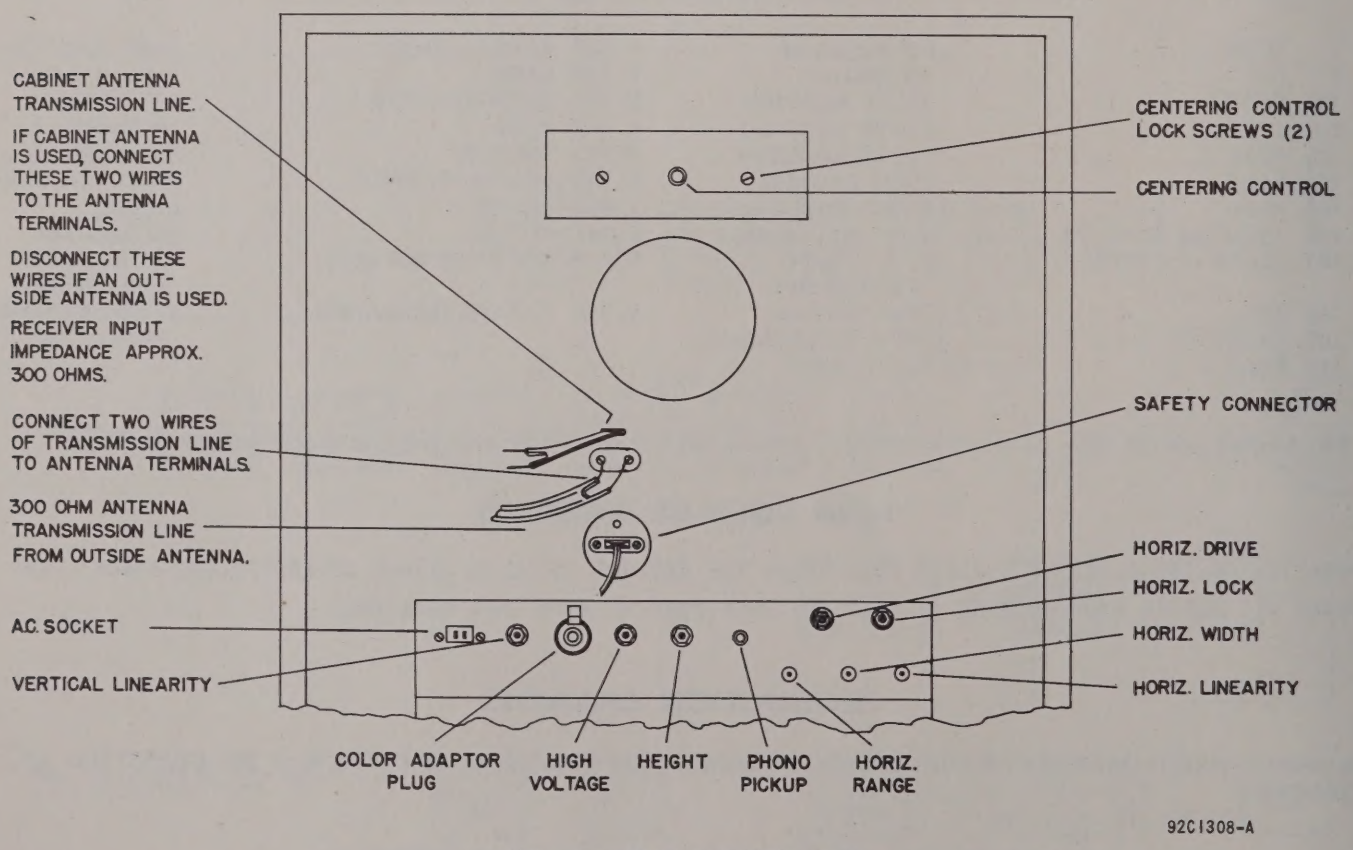
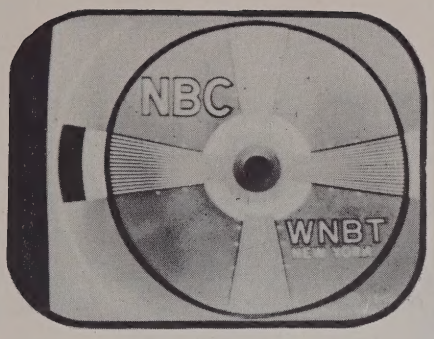


FIG. 3. REAR CABINET VIEW

The service adjustment controls normally will require minor adjustments if any circuit changes or tube replacements are made. The use of a test pattern, generated locally in the shop or obtained from a television station, is recommended for best adjustment results. The operating controls, located on the front apron of the chassis, should be set for as good a picture as possible before making the following adjustments.



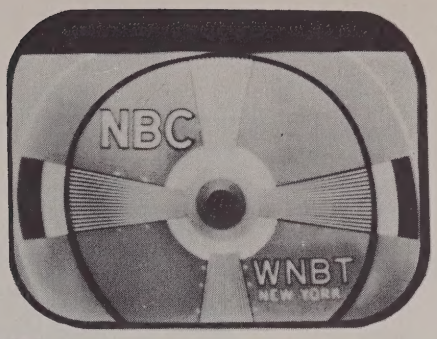


FIG. 4. CENTERING MISADJUSTMENTS

If the picture is not properly centered, remove the two CENTERING CONTROL LOCK SCREWS and move the CENTERING LEVER a short distance in any direction required to recenter the picture. Do not use undue force in making this adjustment as excessive strain may be exerted on the neck of the picture tube. If proper centering cannot be restored in this manner a slight readjustment of the deflection yoke mounting may be necessary.

FIG. 5. HEIGHT CONTROL MISADJUSTMENT

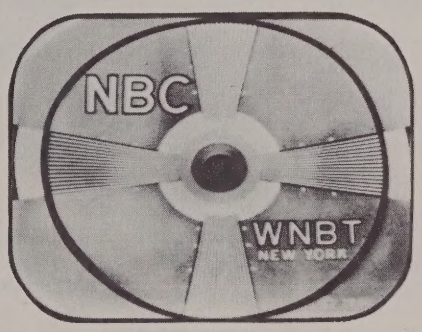


FIG. 6. WIDTH CONTROL MISADJUSTMENT

Adjust the HEIGHT and WIDTH controls so that the picture fills out the dimensions of the screen. A slight readjustment of the CENTERING control may then be necessary.

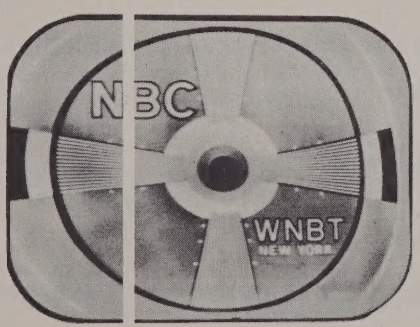


FIG. 7. HORIZONTAL DRIVE CONTROL MISADJUSTMENT

The HORIZONTAL DRIVE is adjusted by advancing the control to a point where a vertical white line appears in the pattern and then backing it off to just beyond the point where the white line disappears.

FIG. 8. VERTICAL LINEARITY CONTROL MISADJUSTMENT

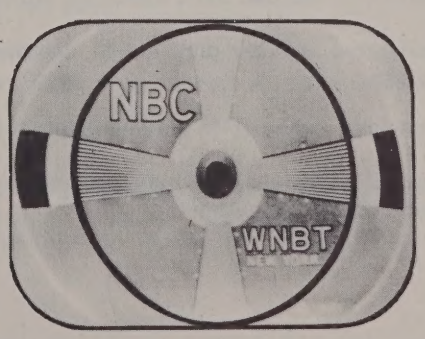


FIG. 9. HORIZONTAL LINEARITY CONTROL MISADJUSTMENT

Adjust the HORIZONTAL LINEARITY and VERTICAL LINEARITY controls for a symmetrical pattern. A slight readjustment of the HEIGHT and WIDTH controls may then be necessary.

TEST PATTERNS COURTESY RCA SERVICE CO.

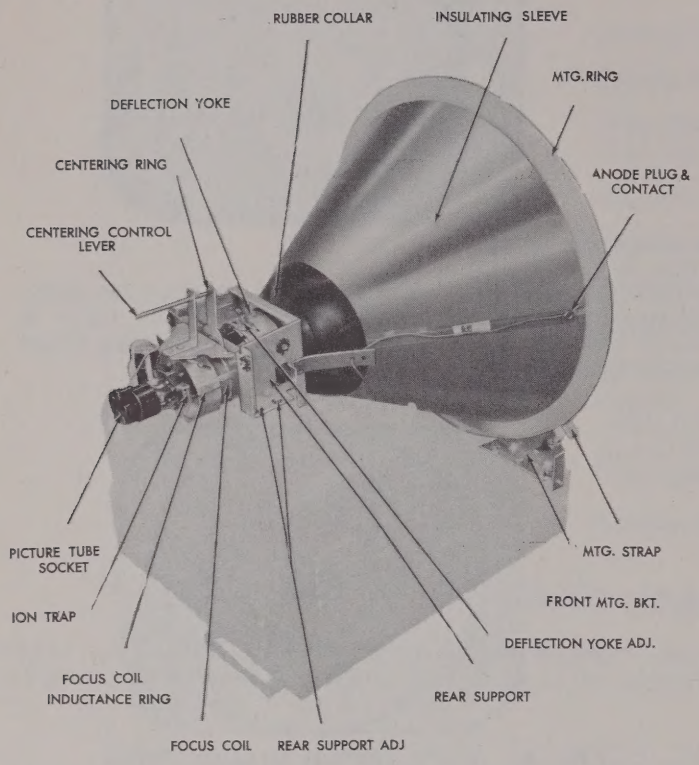


FIG. 10. PICTURE TUBE MOUNTING DETAIL (MODEL 880)

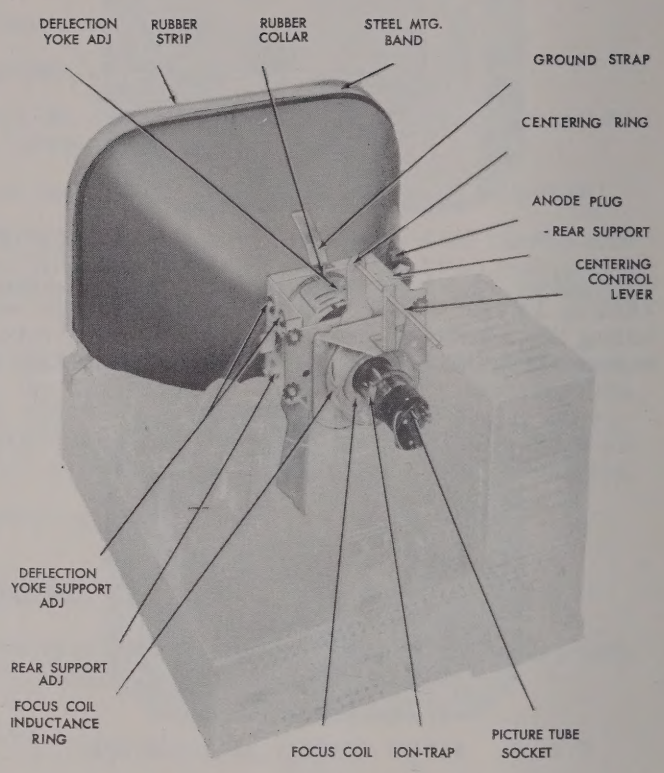


FIG. 11. PICTURE TUBE MOUNTING DETAIL (MODEL 810A)

TO REMOVE THE CHASSIS FROM THE CABINET

1. Remove the knobs on the front panel by pulling in the forward direction.
2. Loosen the panel, mounted on the cabinet back, through which the CENTERING CONTROL LEVER protrudes, by removing the two CENTERING CONTROL LOCK SCREWS.
3. Remove the screw located directly above the SAFETY CONNECTOR.
4. Remove the cabinet back mounting screws and then remove the cabinet back.
5. Remove the speaker plug at the chassis. On table models, remove the speaker mounting nuts and lift out the speaker.
6. Disconnect the built-in antenna leads from the antenna terminal strip.
7. Removal of the chassis may now be completed by removing the five chassis mounting screws and sliding the chassis from the cabinet.

WARNING

PICTURE TUBE HANDLING PRECAUTIONS

The picture tube envelope encloses a high vacuum. Any accidental blow or rough handling may cause the tube to implode with tremendous force. The picture tube should be handled only by qualified persons protected by heavy gloves and shatterproof goggles.

REMOVING THE PICTURE TUBE

1. Remove the chassis from the cabinet by following the procedure outlined on page 6.

2. For ROUND tubes: Insure the discharge of the high voltage filter capacitor by shorting the ANODE PLUG (PL-104) to the chassis through a well insulated wire or test lead. Disconnect the ANODE PLUG.

2. For RECTANGULAR tubes: Disconnect the ANODE PLUG (PL-104) from the side of the tube and insure the discharge of the high voltage filter capacitor by shorting this lead to the chassis. Discharge the aquadag coating by shorting the ANODE CONTACT to the outer coating of the tube.

3. Disconnect the TUBE SOCKET at the base of the tube.

4. Slip the ION TRAP from the neck of the tube.

5. Remove the MOUNTING STRAP from the front rim of the tube.

6. For ROUND tubes: Loosen the four REAR SUPPORT ADJUSTMENT SCREWS. Raise the front of the tube just far enough for the MOUNTING RING to clear the two rubber channels on the tube mounting brackets and slip the tube forward until the neck is clear of the DEFLECTION YOKE and FOCUS COIL. Use a slight twisting pull in order to break the cone of the tube away from the RUBBER COLLAR.

   If the picture tube is to be replaced, the MOUNTING RING and INSULATING SLEEVE should be removed.

6. For RECTANGULAR tubes: Loosen the four REAR SUPPORT ADJUSTMENT SCREWS. Raise the front of the tube just far enough to clear the two stop pads on the front of the picture tube mounting brackets and slip the tube forward until the neck is clear of the DEFLECTION YOKE and FOCUS COIL.

   CAUTION: If the tube fails to slip out smoothly, investigate and remove the cause of trouble. DO NOT USE FORCE.

INSTALLING AND ADJUSTING THE PICTURE TUBE

1. For ROUND tubes: Slip the INSULATING SLEEVE over the cone of the tube and fit the polyethelene MOUNTING RING over the edge of the INSULATING SLEEVE at the front rim of the tube. Make sure that the ANODE CONTACT strap makes a good electrical connection with the metal cone of the tube.

1. For RECTANGULAR tubes: Wrap the RUBBER STRIP around the front rim of the tube. A rubber band may be used to hold the RUBBER STRIP in place.

2. For ROUND tubes: Adjust the MOUNTING RING and the INSULATING SLEEVE so that the ends of the MOUNTING RING come together approximately 90 degrees counter-clockwise (when facing the front of the tube) from the ANODE CONTACT on the INSULATING SLEEVE. A rubber band placed in the MOUNTING RING groove will aid in installation.

2. For RECTANGULAR tubes: Position the tube so that the ANODE CONTACT is located at the left side of the tube as viewed from the screen.

3. For ROUND tubes: Slip the neck of the tube through the RUBBER COLLAR, DEFLECTION YOKE, and FOCUS COIL; seating the groove of the MOUNTING RING on the two rubber channels mounted on the two curved brackets at the front of the chassis. Position the tube so that the joint in the MOUNTING RING is centered at the bottom, near the chassis.

3. For RECTANGULAR tubes: Slip the neck of the tube through the RUBBER COLLAR, DEFLECTION YOKE and FOCUS COIL; seating the RUBBER STRIP on the two front mounting brackets. Make sure that the bottom face of the tube rests against the rubber stop pads and not against the metal mounting brackets.

4. For ROUND tubes: Place the MOUNTING STRAP in the MOUNTING RING groove and tighten firmly.

4. For RECTANGULAR tubes: Place the MOUNTING STRAP around the RUBBER STRIP and tighten firmly.

5. Move the REAR SUPPORT so that the RUBBER COLLAR rests firmly against and supports the cone of the tube. Tighten the REAR SUPPORT ADJUSTMENT SCREWS.

6. Check the ION TRAP for any markings and slip it over the neck of the tube. If the ION TRAP is stamped with an arrow, the arrow should point towards the face of the tube.

7. Connect the PICTURE TUBE SOCKET and the ANODE PLUG.

8. Turn the receiver on and allow a few minutes for warm up.

9. Turn up the BRIGHTNESS control and set the ION TRAP for maximum raster brilliance, backing off the BRIGHTNESS control as the maximum point is approached. The ION TRAP must be rotated about the axis of the tube as well as shifted along the neck to obtain the proper setting. With the BRIGHTNESS control set for slightly above normal brilliance and the CONTRAST control full counter-clockwise, adjust the FOCUS control until the lines of the raster are clearly visible. Readjust the BRIGHTNESS control for normal brightness and touch up the ION TRAP setting.

10. Connect the antenna and tune in a test pattern.

11. Readjust the CONTRAST control until the different shades of the gray scale are clearly visible on the test pattern.

12. Check the position and appearance of the test pattern. If it is off center or shadowed at the corners (electron beam striking the neck of the tube) adjust the CENTERING LEVER. Set the FOCUS control at the center of its range and adjust the FOCUS COIL INDUCTANCE RING as necessary so that a clear sharp picture may be obtained well within the range of the FOCUS control.

CAUTION - It will not be necessary to turn the CENTERING LEVER excessively. Excessive force on the CENTERING LEVER may snap the neck of the tube.

13. If the lines of the raster are not horizontal or square with the escutcheon, loosen the DEFLECTION YOKE ADJ. thumb screw and rotate the DEFLECTION YOKE until the proper raster position is obtained. After the adjustment has been completed, tighten the thumb screw.

14. Follow the procedure under "SERVICE ADJUSTMENTS" and make any minor adjustment of the FOCUS COIL or DEFLECTION YOKE necessary to obtain the desired result.

ADJUSTMENT OF THE HIGH VOLTAGE ON THE PICTURE TUBE ANODE

The second anode potential should be slightly less than 12,500 volts on a receiver that is functioning properly. Since the high voltage is obtained from the horizontal output transformer, the SERVICE ADJUSTMENTS must be made, or known to be in proper adjustment, before a high voltage measurement will have any meaning.

Improper operation of the horizontal sweep circuit or circuit faults in the high voltage filter will generally account for an abnormal anode potential. If the anode potential is low, check the HORIZONTAL DRIVE adjustment as outlined on page 5.

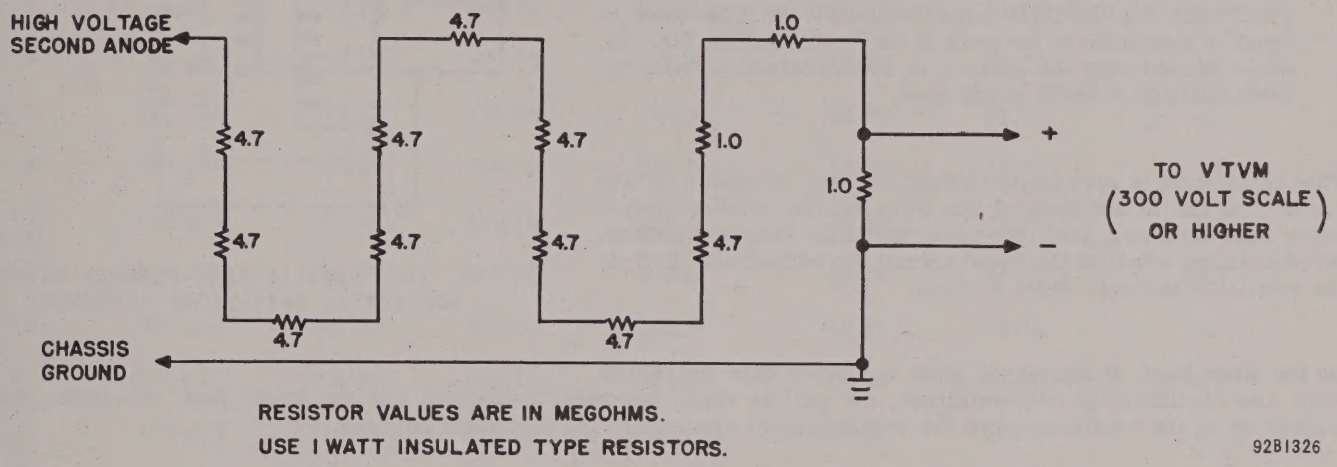


FIG. 12. HIGH VOLTAGE MEASURING CIRCUIT

CAUTION HIGH VOLTAGE

EXERCISE ALL NORMAL HIGH VOLTAGE PRECAUTIONS WHEN MAKING THE FOLLOWING MEASUREMENT.

To measure the second anode potential, set the CONTRAST and BRIGHTNESS controls fully counterclockwise. With the controls in this position, the resistance of the test circuit will simulate the load presented to the high voltage power supply by the picture tube. Connect a test circuit as shown in Fig. 12. Make the resistor string self-supporting and allow adequate clearance between the resistors and chassis parts to prevent high voltage breakdown. A meter scale of 0 to 300 volts or larger should be used. Observe the reading on the meter scale and multiply this reading by 50 to obtain the voltage across the circuit. As an example, if the V.T.V.M. reads 260 volts, the potential is 260 x 50 or 13,000 volts.

After it has been determined that the receiver is otherwise in good working order and properly adjusted, the HIGH VOLTAGE adjustment on the rear of the chassis (See Fig. 3) should be set for a potential slightly less than 12,500 volts. This adjustment has been provided mainly to compensate for variation in line voltage.

HORIZONTAL OSCILLATOR ALIGNMENT

If the HORIZONTAL HOLD control on the front panel fails to restore synchronization the HORIZONTAL RANGE and HORIZONTAL LOCK adjustments should be reset.

1. Turn the HOLD control to the full clockwise position. Adjust the HORIZONTAL RANGE adjustment until a vertical bar appears in the pattern.

2. Turn the HOLD control to the full counterclockwise position. Momentarily switch off the station. Three or four horizontal bars should then appear on the screen. If too many or too few bars appear, the number may be decreased by turning the HORIZONTAL LOCK adjustment in the clockwise direction, or increased by turning the HORIZONTAL LOCK adjustment in the counterclockwise direction.

3. Repeat step 1.

4. Check the action of the front controls on all active channels. Repeat the first three steps if necessary to maintain stable synchronization.

If the above procedure fails to restore stable synchronization, a waveform adjustment may be made with the aid of an oscilloscope.

5. Connect the oscilloscope as shown in Fig. 13. Adjust the TERTIARY WAVEFORM adjustment until the sine wave is equal in amplitude to the peak of the sawtooth (See Fig. 14). while maintaining the picture in synchronization with the HORIZONTAL RANGE adjustment.

This adjustment is very important for correct operation of the circuit. If the broad peak of the wave on the oscilloscope is lower than the sharp peak, the noise immunity becomes poorer, the stabilizing effect of the tuned circuit is reduced and drift of the oscillator becomes more serious.

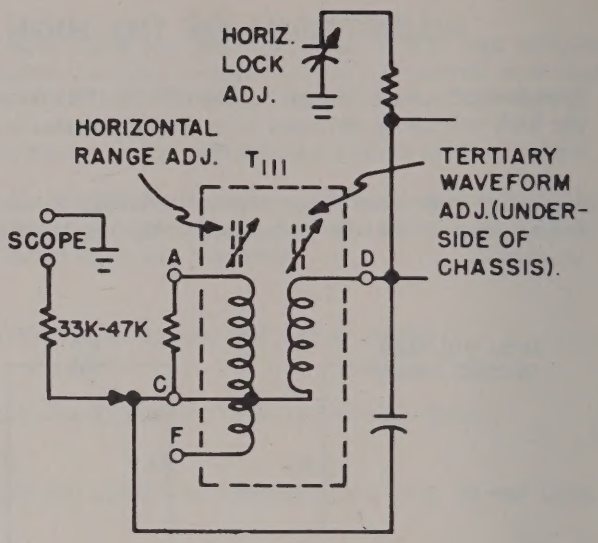


FIG. 13. OSCILLOSCOPE CONNECTION FOR HORIZONTAL OSCILLATOR ALIGNMENT

On the other hand, if the broad peak is higher than the sharp peak, the oscillator is overstabilized, the pull-in range becomes inadequate and the broad peak can cause double triggering of the oscillator when the HOLD control approaches the clockwise position.

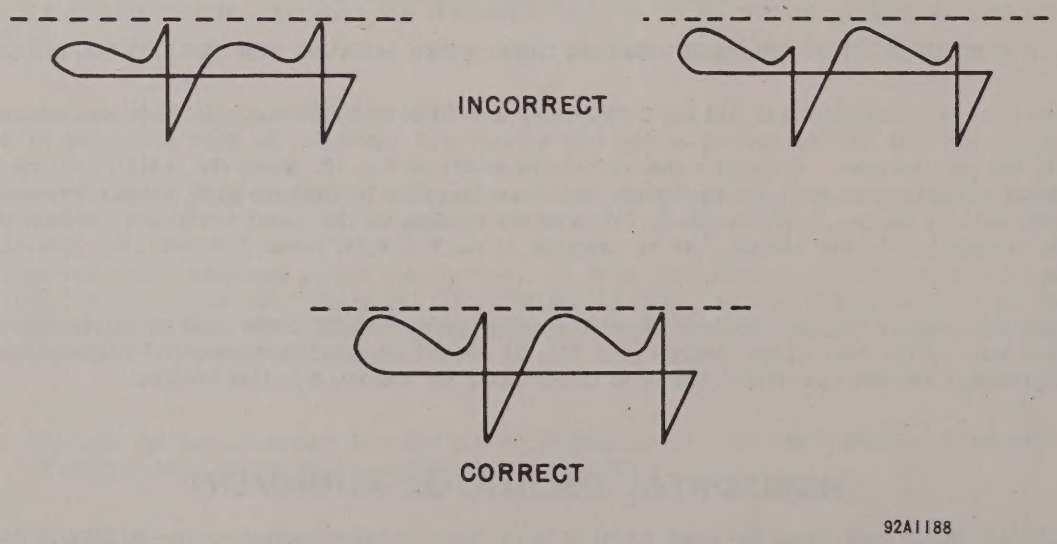


FIG. 14. HORIZONTAL OSCILLATOR WAVEFORMS

6. Remove the oscilloscope and repeat steps 1 and 2 if necessary.

7. Check the action of the front controls and repeat above steps as required to provide positive synchronization on all channels.

TELEVISION CHANNELS vs CARRIER, OSCILLATOR AND I-F FREQUENCIES

Channel No.	Channel Freq. (mc)	Picture Carrier Freq. (mc)	Sound Carrier Freq. (mc)	Receiver Osc. Freq. (mc)	Picture IF Freq. (mc)	Sound IF Freq. (mc)	Picture IF less Sound IF (mc)
2	54-60	55.25	59.75	81.5	26.25	21.75	4.5
3	60-66	61.25	65.75	87.5	26.25	21.75	4.5
4	66-72	67.25	71.75	93.5	26.25	21.75	4.5
5	76-82	77.25	81.75	103.5	26.25	21.75	4.5
6	82-88	83.25	87.75	109.5	26.25	21.75	4.5
7	174-180	175.25	179.75	201.5	26.25	21.75	4.5
8	180-186	181.25	185.75	207.5	26.25	21.75	4.5
9	186-192	187.25	191.75	213.5	26.25	21.75	4.5
10	192-198	193.25	197.75	219.5	26.25	21.75	4.5
11	198-204	199.25	203.75	225.5	26.25	21.75	4.5
12	204-210	205.25	209.75	231.5	26.25	21.75	4.5
13	210-216	211.25	215.75	237.5	26.25	21.75	4.5

F-M SOUND CHANNEL ALIGNMENT

EQUIPMENT REQUIRED

Signal generator covering 4 to 30 MC.
Vacuum tube voltmeter (VTVM).
1N34 crystal detector circuit as shown in Fig. 15.

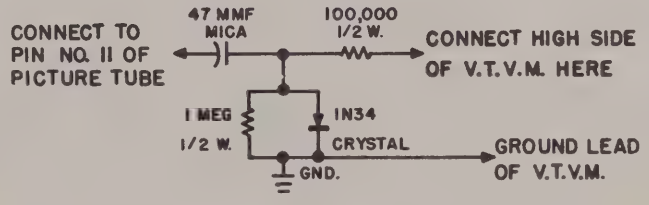


FIG. 15. SOUND ALIGNMENT TEST CIRCUIT 92A1116-A

PROCEDURE

1. Connect the signal generator output, through a .005 mfd. capacitor, to test terminal Ⓐ. (See Fig. 16).
2. Connect the detector circuit and VTVM as shown in Fig. 15.
3. Set the signal generator to 4.5 MC using just enough output to give approximately a 1 volt reading on the VTVM.
4. Adjust the 4.5 MC TRAP (See Fig. 16) for a minimum voltmeter reading.
5. Disconnect the sound alignment test circuit.
6. Connect the VTVM to pin 2 of the 6AL5 FM DETECTOR tube, V110. (Refer to Fig. 28).
7. Adjust L106 (LIMITER GRID adjustment) and the primary of the FM detector transformer, T108 (bottom slug) for maximum indication on the voltmeter. (Refer to Fig. 16).
8. Connect the VTVM across C130 (see Fig. 25) at the output of the FM detector stage and adjust the secondary of the FM detector transformer, T108, (top slug) for the zero reading which occurs between the positive and negative peaks. If the zero reading occurs at more than one setting, use the position nearest the top limit of the tuning slug.
9. Shift the frequency of the signal generator an equal amount on either side of 4.5 MC and touch up the primary of T108 (bottom slug) for approximately equal peaks. Use just enough signal generator output to obtain one volt peaks for best results.
10. After completing the alignment procedure and placing the receiver in operation again, carefully tune in a TV test pattern and adjust the 4.5 MC TRAP for maximum vertical wedge definition.

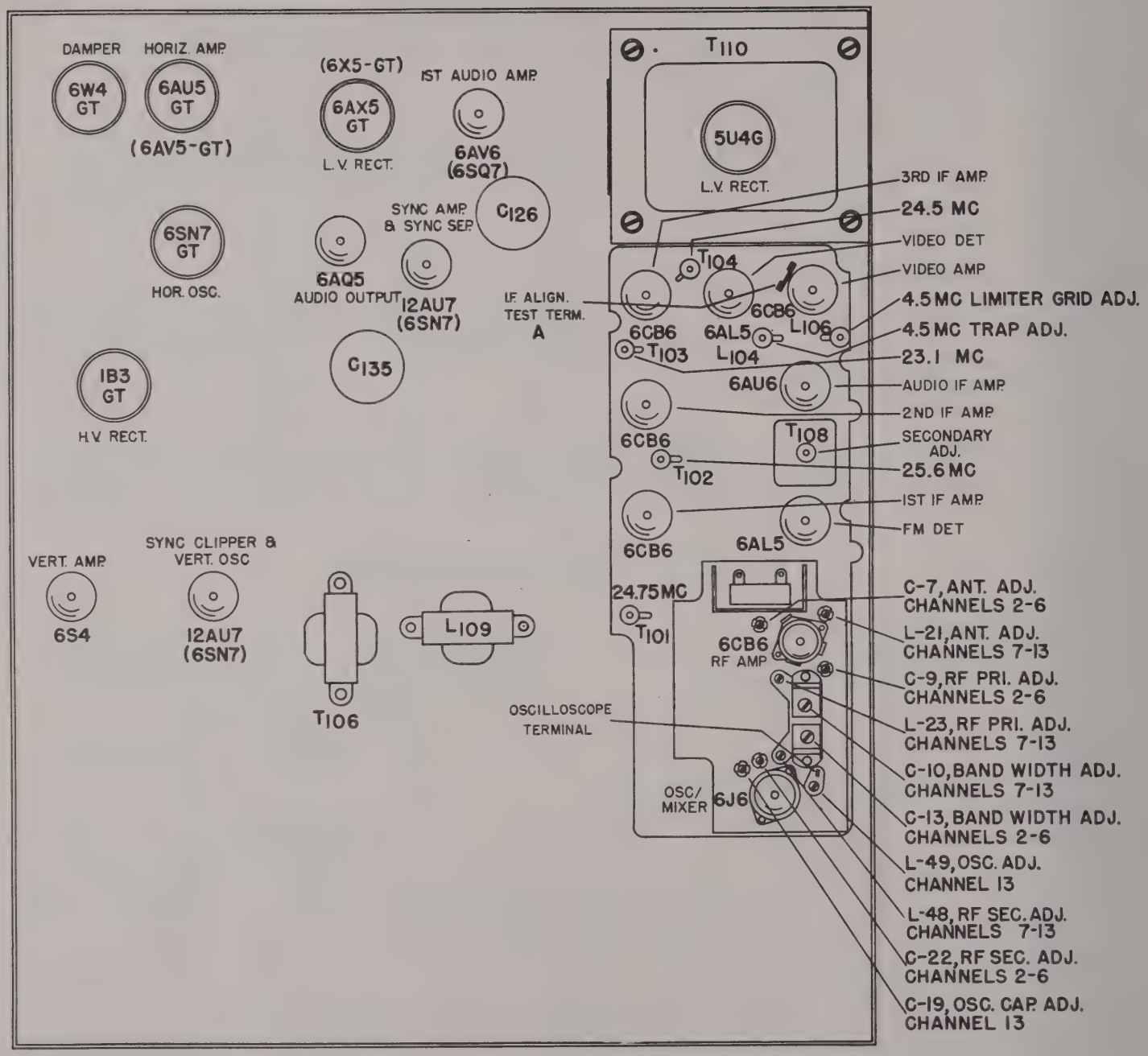


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FIG. 16. TOP VIEW ALIGNMENT POINTS

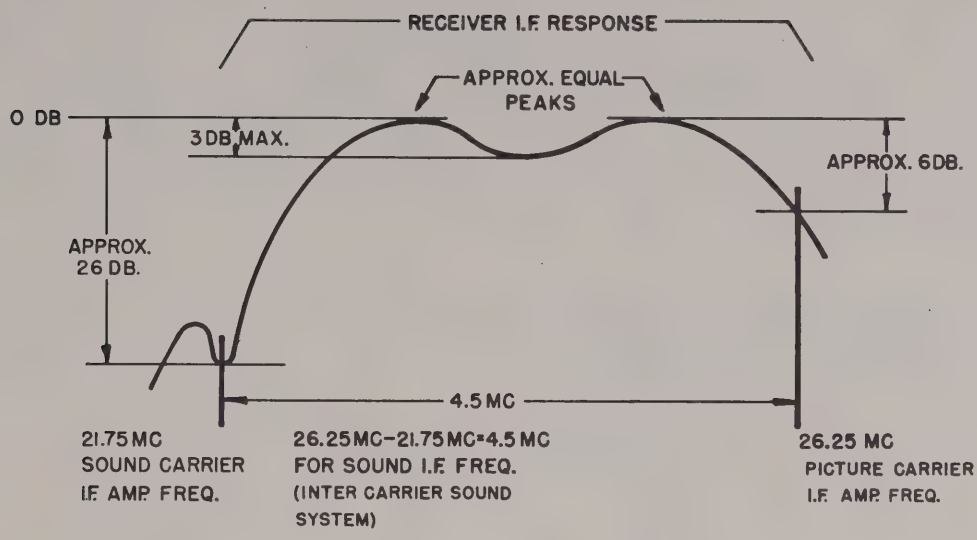

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FIG. 17. IF AMPLIFIER RESPONSE

I-F AMP. ALIGNMENT

1. Connect the VTVM to test terminal Ⓐ. (See Fig. 16).

2. Connect the high side of the signal generator to the OSC/MIXER tube (6J6) by removing the shield on the tube and replacing it with a tight fitting shield to which the signal generator is connected. This shield should not be grounded.

3. Set the CHANNEL SELECTOR to any vacant channel.

4. Set the signal generator output (unmodulated) for a two volt reading on the VTVM and adjust the four IF coils, according to the IF AMPLIFIER ALIGNMENT CHART, for a maximum DC voltage as measured with the VTVM. Readjust the signal generator output as required to maintain the two volt potential at the VTVM.

I-F AMPLIFIER ALIGNMENT CHART

Signal Generator Frequency (No Modulation)	Adjustment (Refer to Fig. 16)	Stage Adjusted
24.75 MC	*T101 (Top & Bottom)	1st IF amp.
25.6 MC	T102 (Top)	2nd IF amp.
23.1 MC	T103 (Top)	3rd IF amp.
24.5 MC	T104 (Top)	Video Detector
21.75 MC	T103 (Bottom)	Sound Trap Adj. (Adj. for Min. Voltage)

5. After adjusting the 21.75 MC Sound Trap recheck the setting of the top slug of T103.

*NOTE - The 1st IF amp. coil (T101) has two iron cores and must be adjusted from both top and bottom for a 24.75 MC. response. Since this is an overcoupled transformer with a broad response, it will be necessary when aligning T101 to connect a 1000 ohm resistor across the primary winding (at the tuner terminals) when tuning the secondary (bottom slug) and then connect the same resistor across the secondary winding when adjusting the primary (top slug).

6. Check the i-f amplifier frequency response by tuning the signal generator from 21 MC through 26.25 MC and observing the change in d-c voltage at the VTVM. If the signal generator output is set for a voltmeter reading of 1.5 volts at the peak i-f amplifier response, the d-c voltage should not drop below one volt between the two peaks normally obtained with this i-f amplifier. If the response is unsatisfactory, repeat the procedure or try slight modifications of the recommended settings to obtain the desired response. Avoid resonating the coils with the iron core at the bottom end of the coil form (adjustment screw near limit of its travel). If a sweep type signal generator and oscilloscope are available the problem of making the final adjustments will be much easier. Check the two carrier i-f responses, 21.75 MC and 26.25 MC. The 21.75 MC response will be approximately 20 db below the peak response (approx. 0.15 volt) and the 26.25 MC response will fall approximately 6 db below the peak, (approx. 0.75 volt). Refer to Fig. 17.

The average i-f amplifier sensitivity, when feeding the signal generator output through the receiver as described in step 2, will run approx. 800 to 1500 microvolts for a one volt d-c peak measured at test terminal (A). (Receiver's oscillator operating on any vacant channel).

TUNER ALIGNMENT

The tuner, employing printed circuit inductances, is of the turret type and covers television channels 2 through 13. Construction of the tuner permits ease of adjustment and part replacement. Available tuner replacement parts are listed in the SERVICE PARTS LIST.

The tuner has been carefully aligned at the factory by personnel using precision equipment. Minor alignment adjustments of the tuner may be necessary after making tube or part replacements. For those service engineers who are properly equipped, as specified below, the following alignment procedure is included.

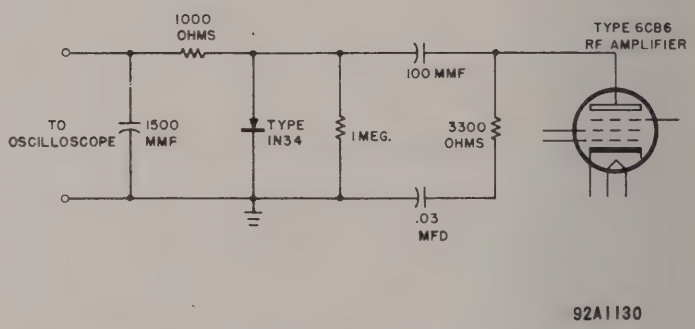

FIG. 18. CRYSTAL DIODE CIRCUIT

EQUIPMENT REQUIRED

1. Sweep Generator - RCA-WR-59A or equivalent.
2. Marker Generator - RCA-WR-39A Television Calibrator or equivalent.
3. Cathode-Ray Oscilloscope - RCA-WO-60C or equivalent.
4. Vacuum Tube Voltmeter - RCA-195A Voltohmyst or equivalent.
5. Crystal Diode Circuit as shown in Fig. 18.

SET-UP PROCEDURE

1. Connect all test equipment and the television receiver to a common ground.
2. Connect the equipment as shown in Fig. 19.
3. Apply a fixed bias to the tuner by connecting a 1.5 volt bias cell between tuner terminal #1 and chassis ground.
4. Rotate C-10 and C-13 clockwise (fully in). See Fig. 16.

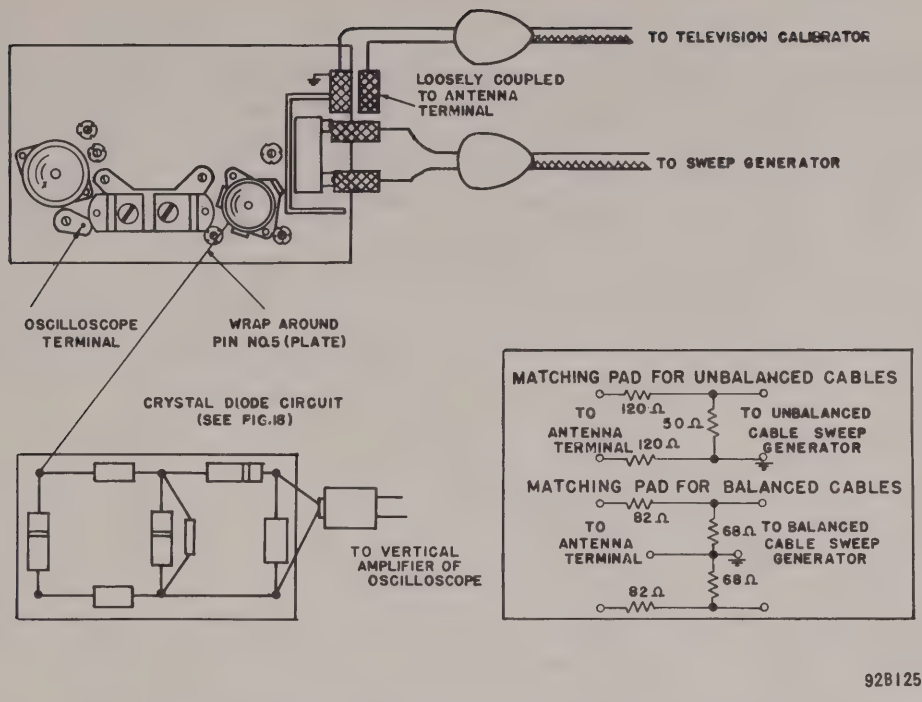

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FIG. 19. TUNER ALIGNMENT TEST EQUIPMENT CONNECTIONS

ANTENNA CIRCUIT ALIGNMENT

See Figure 16 for location of all adjustments in this section.

5. Set test equipment and tuner to channel 6. (82-88 MC).

6. Adjust C-7 for required response curve on the cathode-ray oscilloscope (Fig. 20A). Peak in center with marker "pips" down equally on either side of curve.

7. Tune test equipment and tuner to channel 7.

8. Adjust L-21 for required response curve on the cathode-ray oscilloscope (Fig. 20B). Peak in center with marker "pips" down equally on either side of curve.

9. If L-21 requires a large adjustment, repeat steps 5 through 8 until the required response curves are obtained.

10. Check the response curves on channels 2, 3, 4, 5 and 6 and readjust C-7 for a compromise response curve for each channel. If the curves are more similar to 20C and they are to 20D, adjust C-7 counterclockwise. If the curves are more similar to 20D than they are to 20C, adjust C-7 clockwise. Curves for each of the channels 2 through 6 should be similar to Fig. 20A, although alignment is complete if some curves are similar to Fig. 20C and some curves are similar to Fig. 20D. Adjustment is necessary only if all curves resemble Fig. 20C or Fig. 20D, rather than a compromise between Fig. 20C and Fig. 20D.

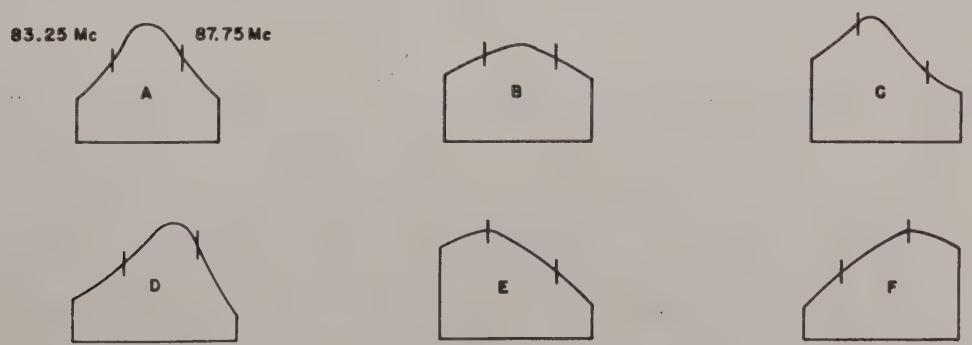

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FIG. 20. ANTENNA CIRCUIT ALIGNMENT CURVES

11. Check the response curves on channels 7, 8, 9, 10, 11, 12 and 13 and readjust L-21 for a compromise response curve for each channel. If the curves are more similar to Fig. 20E than they are to Fig. 20F, adjust L-21 clockwise. If the curves are more similar to Fig. 20F than they are to Fig. 20E, adjust L-21 counterclockwise. Curves for each of these channels should appear similar to that of Fig. 20B, although this portion of the alignment is complete if some curves are similar to Fig. 20E and some curves are similar to Fig. 20F. Adjustment is necessary only if all curves resemble Fig. 20E or Fig. 20F rather than a compromise between Fig. 20E and Fig. 20F.

12. Remove crystal diode circuit and connect oscilloscope directly to the OSCILLOSCOPE TERMINAL.

R-F ALIGNMENT

See Fig. 16 for location of all adjustments in this section.

13. Set tuner and test equipment to channel 6.

14. Adjust C-9, C-13 and C-22 to obtain a response curve on the oscilloscope similar to that shown on the normal curve in Fig. 21. This may be accomplished in the following manner:

    a. Rotate C-13 counterclockwise approximately one-half turn.

    b. Refer to Fig. 21 to determine the effects of tuning C-9, C-13 and C-22, C-9 primarily controls the center frequency of the response curve. C-22 primarily controls tilt of the curve and C-13 its bandwidth.

    c. It may be necessary to readjust C-22 after adjusting C-13.

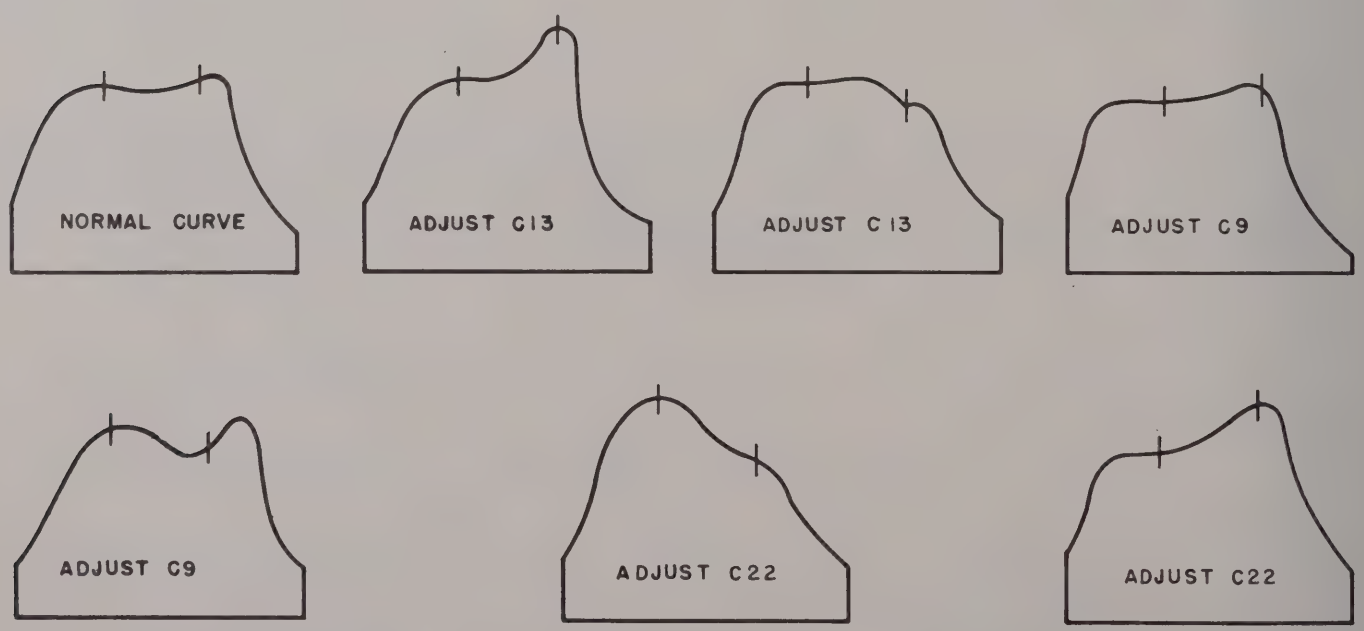

FIG. 21. RF CIRCUIT ALIGNMENT CURVES, CHANNELS 2-6

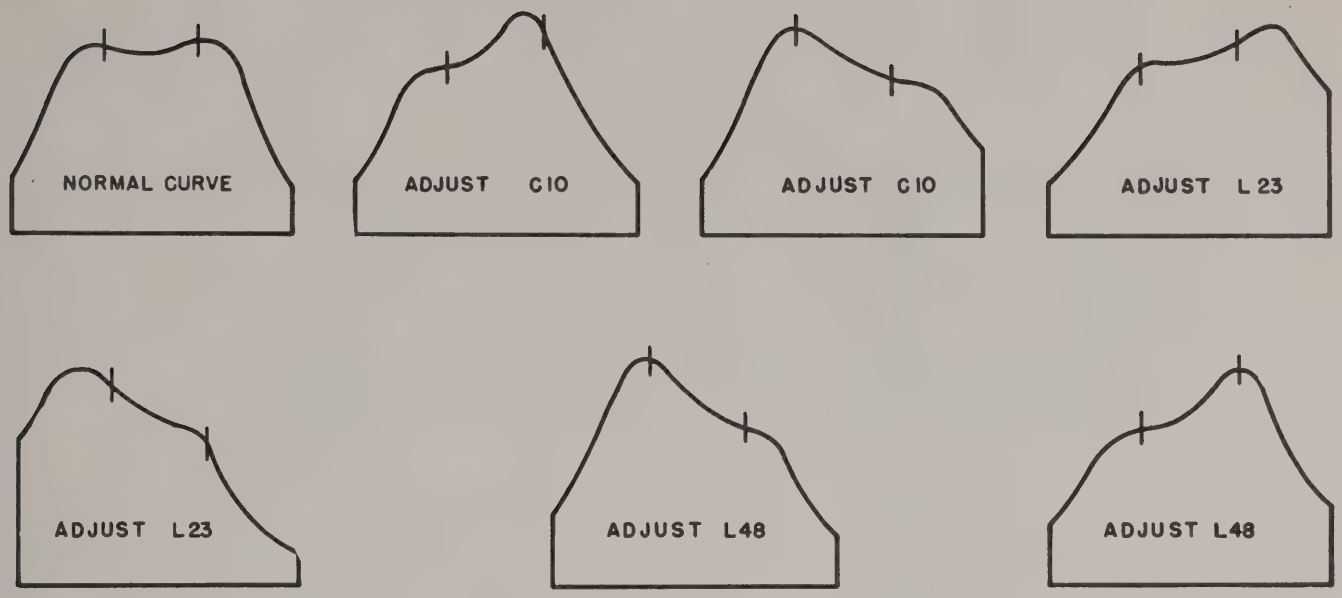

FIG. 22. RF CIRCUIT ALIGNMENT CURVES, CHANNELS 7-13

15. Set tuner and test equipment to channel 12.

16. Adjust C-10, L-23 and L-48 to obtain a response curve on the oscilloscope similar to that shown as the normal curve in Fig. 22. This may be accomplished in the following manner:

    a. Rotate C-10 counterclockwise approximately one-half turn.

    b. Refer to Fig. 22 to determine the effects of tuning C-10, L-23 and L-48. L-23 primarily controls the center frequency of the response curve. L-48 primarily controls tilt of the curve and C-10 its bandwidth.

    c. It may be necessary to readjust L-48 after adjusting C-10.

17. Check the response curve for each of channels 2 through 6. Make compromise adjustments to C-9, C-13 and C-22 as is required so that the response curves for each channel will approximate those shown in Fig. 23.

    C-9 and C-22 have an effect on the response of channels 7 through 13. It may be necessary to include adjustment of these capacitors in the adjustment of those channels. This should be done ONLY if two or more curves on the high channels slant in opposite directions. Care must be exercised so that curves of channels 2 through 6 will not be thrown far out of line. A recheck of channels 2 through 6 may be necessary.

18. Check the response curve for each of channels 7 through 13. Make compromise adjustments to C-10, L-23 and L-48 as is required so that the response curves for each channel will approximate those shown in Fig. 23.

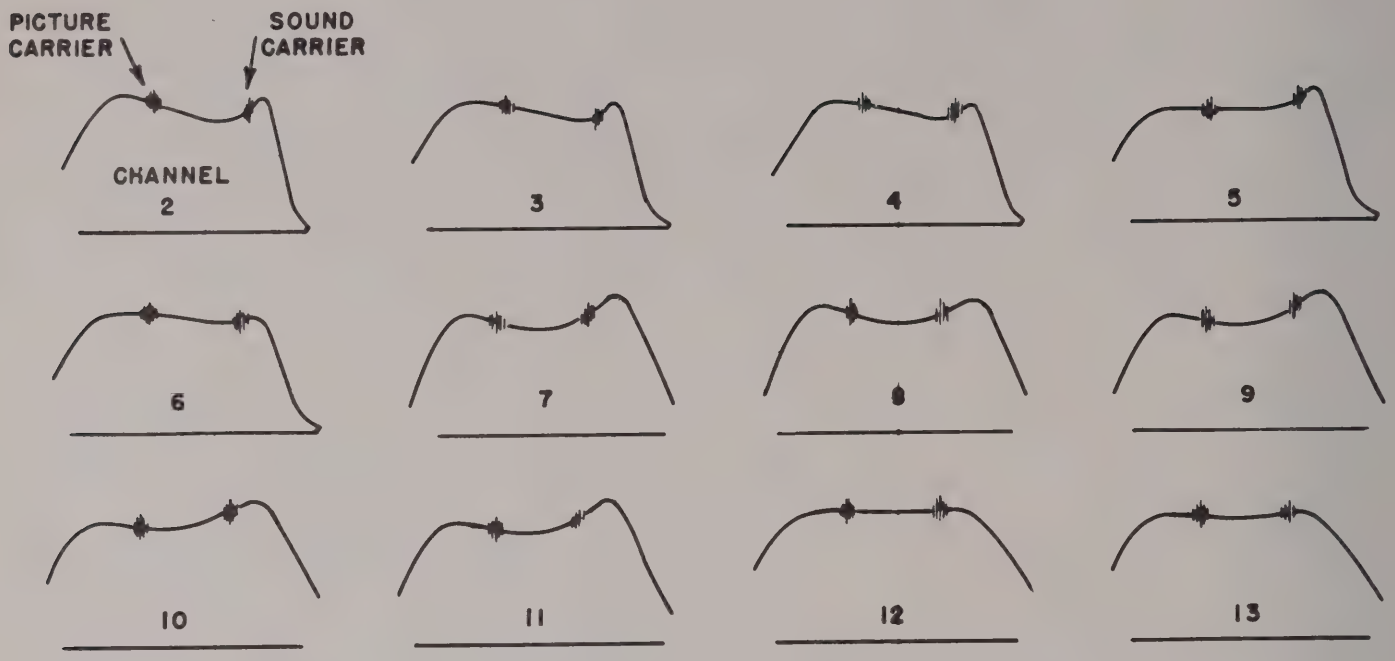

FIG. 23. CHANNEL RESPONSE CURVES 9281166

OSCILLATOR ALIGNMENT

EQUIPMENT REQUIRED

1. Sweep Generator covering the 54-88 MC and 174-216 MC range, with a sweep width of 0-10 MC.
2. Marker Generator covering all sound carriers.
3. Marker Generator covering the sound intermediate frequency.
4. Oscilloscope

PROCEDURE

1. Connect the vertical input of the oscilloscope to terminal 5 of the tuner by means of the crystal diode circuit shown in Fig. 18.
2. Connect the sweep generator and the RF marker generator to the antenna terminals.
3. Connect the IF marker generator to the vertical input of the oscilloscope.
4. Set the sweep width as necessary to give a good response curve.
5. Set the RF marker generator to the exact sound carrier frequency of the channel to which the receiver is tuned. (start with channel 13).
6. Set the IF marker generator to 21.75 MC.
7. Set the FINE TUNING control to mid range.
8. Adjust trimmer capacitor C-19 until the pips from the IF and RF markers, as seen on the oscilloscope, coincide. These pips should separate as the FINE TUNING control is rotated.
9. Set the RF marker generator to exactly the sound carrier of each channel and adjust each individual oscillator inductance for coinciding marker pips on the oscilloscope. If any one channel has insufficient range, with individual oscillator adjustment, readjust C-19 to effect proper adjustment of this channel and then readjust all other individual adjustments (L-37 through L-47) for coinciding marker pips.
10. Recheck the RF circuit alignment curves of Fig. 21 and 22.

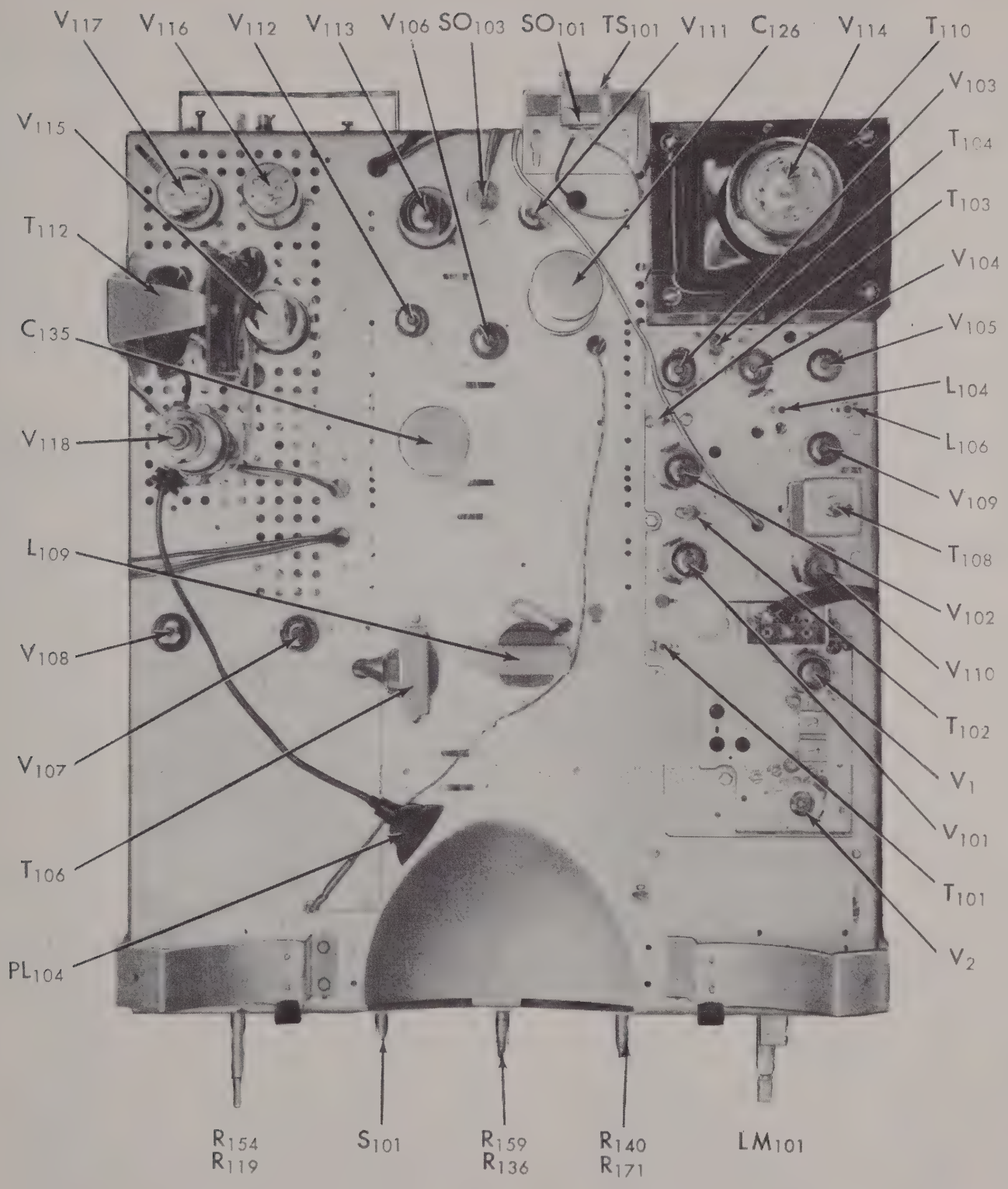

FIG. 24. TOP CHASSIS VIEW, COMPONENT LOCATION

(Chassis is illustrated with mounting for rectangular picture tube)

SERVICE PARTS LIST

Reference Symbol	Description	Hallicrafters' Part Number
	TRANSFORMERS AND COILS	
T-101	Transformer, mixer i-f	50B471-C
T-102	Transformer, 1st i-f amplifier	50A475
T-103	Transformer, 2nd i-f amplifier	50A476-E
T-104	Transformer, 3rd i-f amplifier	50A477
T-106	Transformer, vertical oscillator	55C115
T-107	Transformer, vertical output	55B151-B
T-108	Transformer, ratio detector	50C473-D
T-109	Transformer, audio output	55B150
T-110	Transformer, power	52C204
T-111	Transformer, horizontal oscillator	51B1242
T-112	Transformer, horizontal output (model 810A)	55C152-B
T-112	Transformer, horizontal output (model 880)	55C149
T-113	Transformer, power (used with alternate power supply)	52C224
T-114	Transformer, power (used with alternate power supply	52C223
L-101	Coil, video peaking	51A1256
L-102	Coil, video peaking	51A1260
L-103	Coil, video peaking	51A1257
L-104,106	4.5 MC TRAP; LIMITER GRID adj.	50A474-G
L-105	Coil, video peaking	51A1259
L-107	Coil, FOCUS (model 810A)	51B1246
L-107	Coil, FOCUS (model 880)	51A1287
L-108	Deflection yoke (model 810A)	53C201-D
L-108	Deflection yoke (model 880)	53C197-B
L-109	Choke, filter	56C116
L-110	Coil, HORIZONTAL LINEARITY	51A1243-C
L-111	Coil, WIDTH control	51A1261-C
L-112	Choke, heater	53A200
	CAPACITORS	
CRL-101	Vertical integrating network	49A015
CRL-102	Audio coupling network	49A017
C-101,102, 103,104, 106,107, 121,163, 164	5000 mmf. 450 V., ceramic	47A168
C-105,117	68 mmf. 500 V., ceramic	47B20680K5
C-108	10 mmf. 500 V., ceramic	47B20100K5
C-109,110	.5 mfd. 25 V., tubular	46A177
C-111	100 mfd. 10 V., electrolytic	45B170
C-112	2.2 mmf. 500 V., ceramic	47A160-4
C-113,128	47 mmf. 500 V., ceramic	47X20SL470K
C-114	220 mmf. 500 V., mica	47X20B221K
C-115,116, 140,143, 146,155	.05 mfd. 600 V., tubular	46AY503J
C-118	2X10 mfd. 450 V., electrolytic	45A172
C-119	120 mmf. 500 V., mica	47X20B121K
C-120,144	.5 mfd. 200 V., tubular	46AT504J
C-122,130	1000 mmf. 500 V., ceramic	47B20A102M5
C-123	6800 mmf. 500 V., mica	47X35B682K
C-124,131, 134,136, 138	.01 mfd. 600 V., tubular	46AY103J
C-125	.047 mfd. 600 V., tubular	46BR473L6
C-126	60-40 mfd. 450 V., 75 mfd. 50 V., electrolytic	45B173
C-127,158, 161	.1 mfd. 600 V., tubular	46AX104J
C-129	2X4000 mmf. 450 V., ceramic	47A218
C-132,154	5 mfd. 50 V., electrolytic	45B175
C-133	330 mmf. 500 V., ceramic	47B20331K5
C-135	40-40 mfd. 250 V., 40 mfd. 450 V., 20 mfd. 25 V., electrolytic	45B174
C-137	.1 mfd. 200 V., tubular	46AU104J
C-139	56 mmf. 500 V., mica	47X20A560M
C-141,142	.01 mfd. 600 V., tubular	46BR103J6
C-145	.02 mfd. 600 V., tubular	46AY203J
C-147,156	330 mmf. 500 V., mica	47X20B331K
C-148	.01 mfd. 400 V., tubular	46BR103E4
C-149	Trimmer, HORIZONTAL LOCK control	44A391
C-150,151	82 mmf. 500 V., mica	47X20B820K
C-152	820 mmf. 500 V., mica	47X25B821K
C-153	4700 mmf. 500 V., mica	47X35B472K
C-157,159	.03 mfd. 600 V., tubular	46AY303J
C-160	8 mfd. 475 V., electrolytic	45A103
C-162	500 mmf. 20,000 V., ceramic	47A223
	RESISTORS	
R-101,134 163	4700 ohms 1/2 watt, carbon	23X20X472K
R-102,108, 110,111	100 ohms 1/2 watt, carbon	23X20X101K
R-103,106, 112,118, 147	150 ohms 1/2 watt, carbon	23X20X151K
R-104,107, 180	47 ohms 1/2 watt, carbon	23X20X470K
R-105,174	12,000 ohms 1/2 watt, carbon	23X20X123K
R-109,122, 137	10,000 ohms 1/2 watt, carbon	23X20X103K
R-113	6800 ohms 1/2 watt, carbon (part of coil L-101)	
R-114,121	2200 ohms 1/2 watt, carbon (part of coils, L-102, 105)	
R-115,145	1 megohm 1/2 watt, carbon	23X20X105M
R-116	3300 ohms 1/2 watt, carbon	23X20X332K
R-117,123	220,000 ohms 1/2 watt, carbon	23X20X224M
R-119,154	1 megohm/2500 ohms, OFF-ON-VOLUME/CONTRAST control	25B888
R-120	15,000 ohms 1/2 watt, carbon (part of coil L-103)	
R-124	2.2 megohms 1/2 watt, carbon	23X20X225M
R-125	270,000 ohms 1/2 watt, carbon	23X20X274M
R-126,132, 138	47,000 ohms 1/2 watt, carbon	23X20X473K
R-127	5600 ohms 2 watts, carbon	23X40X562K
R-128	820,000 ohms 1/2 watt, carbon	23X20X824M
R-129,131	2200 ohms 1/2 watt, carbon	23X20X222K
R-130	6800 ohms 1/2 watt, carbon	23X20X682K
R-133	15,000 ohms 2 watts, carbon	23X40X153K
R-135	1500 ohms 1 watt, carbon	23X30X152K
R-136,159	2500/50,000 ohms, FOCUS-BRIGHTNESS control	25B889
R-139	1 megohm 1/2 watt, carbon	23X20X105K
R-140,171	1 megohm/50,000 ohms, VERTICAL-HORIZONTAL HOLD control	25B916
R-141	5000 ohms, VERTICAL LINEARITY control	25B712
R-142,175	8200 ohms 1/2 watt, carbon	23X20X822K
*R-143	1 megohm 1 watt, carbon	23X30BF105M
R-144	1000 ohms 1 watt, carbon	23X30X102K
R-146	2.5 megohms, HEIGHT control	25B711
R-148	22,000 ohms 1/2 watt, carbon	23X20X223K
R-149	270 ohms 1/2 watt, carbon	23X20X271K
R-150	33,000 ohms 1/2 watt, carbon	23X20X333K
R-151,152	10,000 ohms 1/2 watt, carbon	23X20X103J
R-153	10 megohms 1/2 watt, carbon	23X20X106M
R-155	270 ohms 1 watt, carbon	23X30X271K
R-156	15,000 ohms 10 watts, WW	24A922
R-157	100,000 ohms 1/2 watt, carbon	23X20X104M
R-158	1000 ohms 5 watts, WW	24A921
R-160,162	560 ohms 1/2 watt, carbon	23X20X561K
R-161	1000 ohms 1/2 watt, carbon	23X20X102K
R-164	750 ohms 10 watts, WW	24A920
R-165	3900 ohms 1/2 watt, carbon	23X20X392K
*R-166	120,000 ohms 1 watt, carbon	23X30BF124K
R-167,177	330,000 ohms 1/2 watt, carbon	23X20X334K
R-168	820,000 ohms 1/2 watt, carbon	23X20X824K
R-169	82,000 ohms 1 watt, carbon	23X30X823K
*R-170	330,000 ohms 1 watt, carbon	23X30BF334J
R-172	68,000 ohms 1/2 watt, carbon	23X20X683K
R-173	150,000 ohms 1/2 watt, carbon	23X20X154K
R-176	50,000 ohms, HORIZONTAL DRIVE control	25A858
*R-178	47,000 ohms 1 watt, carbon	23X30BF473K
R-179	470,000 ohms 1/2 watt, carbon	23X20X474M

* Use exact replacement part only.

SERVICE PARTS LIST (Cont.)

Reference Symbol	Description	Hallicrafters' Part Number
	RESISTORS (Cont.)	
R-181	220 ohms 3 watts, WW	24A925-B
R-182	200 ohms WW, HIGH VOLTAGE control	25B714
R-183	2200 ohms 1 watt, carbon	23X30X222K
R-184	3.3 ohms 1/2 watt, carbon	23X20X033K
R-185	1 megohm 1 watt, carbon	23X30X105M
R-186	150,000 ohms 1/2 watt, carbon	23X20X154M
R-187	680 ohms 1/2 watt, carbon	23X20X681M
R-188	220 ohms 20 watts, WW (used on alternate power supply)	24BH221D
	TUBE COMPLEMENT	
V-1	Type 6CB6: r-f amp.	90X6CB6
V-2	Type 6J6: osc./mixer	90X6J6
V-101,102, 103,105	Type 6CB6: 1st, 2nd and 3rd i-f amplifier; video amp.	90X6CB6
V-104,110	Type 6AL5: Video detector; f-m detector	90X6AL5
V-106,107	Type 12AU7: sync. amp. and sync. separator; sync. clipper and vertical osc. or	90X12AU7
	Type 6SN7-GT: same as above	90X6SN7-GT
V-108	Type 6S4: vertical amplifier	90X6S4
V-109	Type 6AU6: audio i-f amplifier	90X6AU6
V-111	Type 6AV6: audio amplifier or	90X6AV6
	Type 6SQ7: audio amplifier	90X6SQ7
V-112	Type 6AQ5: audio output	90X6AQ5
V-113	Type 6AX5-GT: low voltage rectifier	90X6AX5-GT
V-114	Type 5U4G: low voltage rectifier	90X5U4G
V-115	Type 6SN7-GT: horizontal oscillator	90X6SN7-GT
V-116	Type 6AU5: horizontal amplifier or	90X6AU5
	Type 6AV5-GT: horizontal amplifier	90X6AV5-GT
V-117	Type 6W4-GT: damper	90X6W4-GT
V-118	Type 1B3-GT: high voltage rectifier	90X1B3-GT
V-119	Type 16RP4: picture tube (model 810A)	90X16RP4
V-119	Type 19AP4A: picture tube (model 880)	90X19AP4A
	CHASSIS PARTS	
	Bracket, deflection yoke and focus coil mtg.; bottom (model 810A)	67D1235
	Bracket, deflection yoke and focus coil mtg.; bottom (model 880)	67D1248
	Bracket, deflection yoke and focus coil mtg.; upper	67D1348
	Bracket, deflection yoke mtg. (mounted on 67D1348)	67C1244
	Bracket, deflection yoke support	67B1305
	Bracket, focus coil mtg. (mounted on 67B1386)	67C1251
	Bracket, mounting for TS-101 and SO-101	67C1258-E
	Bracket, picture tube mtg.; front right (model 810A)	67D1237
	Bracket, picture tube mtg.; front right (model 880)	67D1263
	Bracket, picture tube mtg.; front left (model 810A)	67D1238
	Bracket, picture tube mtg.; front left (model 880)	67D1262
	Bracket, pivot; centering control lever (model 810A)	67B1351
	Bracket, pivot; centering control lever (model 880)	67B1353
	Channel, rubber; 2 (mounted under front of model 880 picture tube)	16A205
	Collar, picture tube mtg.; rubber (mounted in front of deflection yoke)	16C202
	Cushion, picture tube mounting; sponge rubber (model 810A)	16C163
F-101	Fuse, 1/4 amp. 250 volts	39A344
	Ion trap	21A101-B
LM-101	Lamp, pilot; GE #47	39A004
	Lead, picture tube anode; polyethelene (model 880)	87A1046
	Lever, centering control (model 810A)	74B343
	Lever, centering control (model 880)	74B353
	Mounting ring, picture tube; polyethelene (model 880)	8D1060
	Pilot light assembly	86A096

Reference Symbol	Description	Hallicrafters' Part Number
	CHASSIS PARTS (Cont.)	
	Plate, focus coil assembly mtg. (mounted on 67D1348)	67C1386
PL-105	Plug, color attachment	10A299
PL-104	Plug, 16RP4 anode (model 810A)	10A374-D
PL-104	Plug, 19AP4A anode (part of 8D1059)	
	Ring, centering (part of 67C1386)	76B636-B
	Shell, color attachment plug	69A369
	Shield, pilot light	69A343-D
	Sleeve, insulating; plastic (model 880 picture tube)	8D1059
SO-101	Socket, a-c power	10A286
	Socket assembly, high voltage rectifier tube	6A355
SO-105	Socket, color attachment	6A370
SO-104	Socket, color attachment power	10A015
	Socket, miniature 7 pin tube; wafer	6A340
	Socket, miniature 9 pin tube; wafer	6A334
	Socket, miniature 9 pin tube; molded mica filled	6A360
	Socket, octal tube; molded	6B296
	Socket, octal tube; molded mica filled	6A364
SO-102	Socket, phono input	36A041
	Socket, picture tube (model 810A)	6B357-F
	Socket, picture tube (model 880)	6A371
SO-103	Socket, speaker	10A373
	Spring, knob escutcheon ground (model 880)	75B192
	Spring, picture tube ground (model 810A)	75B177
	Strap, picture tube mtg.; (model 810A)	76B594
	Strap, picture tube mtg.; (model 880)	76B598
S-101	Switch, OFF-ON (part of R-154)	
S-102	Switch, DPDT (PHONO-TV)	60B390
TS-101	Terminal strip, antenna	88A020
	Tuning unit assembly, complete with tubes	1D961-X4
	TV TUNER PARTS	
	Antenna Coil Assembly	120A010
	Channel 2 Strip	8A1223
	Channel 3 Strip	8A1224
	Channel 4 Strip	8A1225
	Channel 5 Strip	8A1226
	Channel 6 Strip	8A1227
	Channel 7 Strip	8A1228
	Channel 8 Strip	8A1229
	Channel 9 Strip	8A1230
	Channel 10 Strip	8A1231
	Channel 11 Strip	8A1232
	Channel 12 Strip	8A1233
	Channel 13 Strip	8A1234
	CABINET PARTS	
	Antenna, Silver Vortex built-in	57C147
	Cabinet (model 810A)	78F577
	Cabinet (model 880)	78F553-D
	Cabinet back (model 810A)	8A1158-B
	Cabinet back (model 880)	8E1157-D
	Escutcheon, front controls	7C203-B
	Escutcheon, picture tube (model 810A)	7D196
	Escutcheon, picture tube (model 880)	7D211
	Glass, safety (model 810A)	22D292-D
	Glass, safety (model 880)	22D309
	Knob, CHANNEL SELECTOR	15D293-C
	Knob, CONTRAST	15D265-F
	Knob, FINE TUNING	15A299
	Knob, OFF-VOLUME	15C297-C
	Knob, PHONO-TV	15A284
PL-101	Line cord and plug, PL-102	87A1668
	Mask, escutcheon (model 810A)	7D217
	Mask, escutcheon (model 880)	7D212
PL-103	Plug, speaker	10A372
	Shield, picture tube socket (model 810A)	69A334
	Shield, picture tube socket (model 880)	69A340
	Speaker, 5 inch PM (model 810A)	85C103-C
	Speaker, 10 inch PM (model 880)	85C106
	Spring, tube escutcheon ground (model 880)	75B195

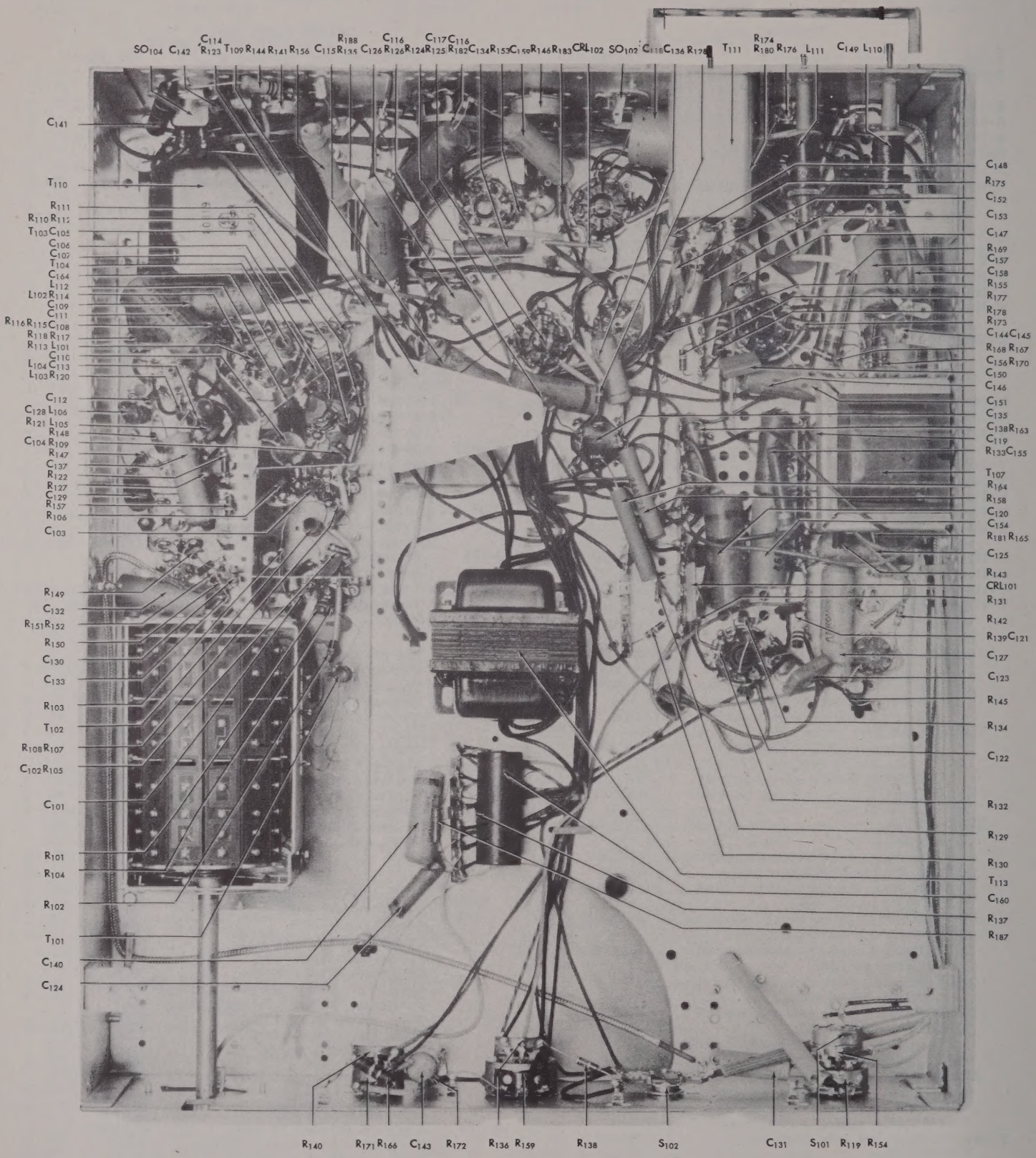

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FIG. 25. BOTTOM CHASSIS VIEW, COMPONENT LOCATION

(Chassis illustrated above uses alternate power supply)